

## CLAIMS

1. A method of transmitting a message from a wireless radio-frequency short-range communication network via a gateway to a network external to the communication network, the method comprising:

- 5 receiving a first message via a short-range radio link at the gateway from a terminal device of the short-range communication network, the first message being addressed to an element external to the short-range communication network, and the first message comprising a network address of the terminal device as a transmitter's address and a first port number as a source  
10 port number, the network address of the terminal device being a network address that is used inside the short-range communication network, wherein the method further comprises:

allocating a second port number to the terminal device;

- replacing the network address of the terminal device in the first  
15 message with a network address of the gateway and the first port number with the second port number;

- generating a correlation between the network address of the terminal device, the first port number and the second port number and storing said correlation in a memory available to the gateway for identification of the terminal device; and  
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transmitting the first message from the gateway to the element external to the short-range communication network, the first message having the network address of the gateway as a transmitter's address and said second port number as a source port number.

- 25 2. A method as claimed in claim 1, the method further comprising:

- receiving, at the gateway, a particular second message from the element external to the short-range communication network, the second message being transmitted in response to the first message arrived at the element external to the short-range communication network, and the second message  
30 comprising the network address of the gateway as a receiver's address and the second port number as a destination port number;

- replacing, in the second message at the gateway, based on said correlation, the network address of the gateway with the network address of the terminal device, and replacing the second port number with the first port  
35 number;

transmitting the second message from the gateway to the terminal

device in the short-range communication network over the short-range radio link.

3. A method as claimed in claim 1, wherein the network address of the terminal device is a virtual address used only inside the short-range communication network.

4. A method as claimed in claim 2, wherein the gateway comprises a network card and the messages are transmitted between the short-range communication network and the network external to the short-range communication network via said network card.

5. A method as claimed in claim 4, wherein the network address of the gateway (21) is an IP address (Internet Protocol) and is configured in advance by inputting the IP address in the terminal device of the short-range communication network, by transferring the IP address over a wireless short-range radio-frequency connection from the terminal device to the gateway and by using software to configure the network card based on the IP address received.

6. A method as claimed in claim 2, wherein the messages (41 to 42) are transmitted in at least one of the following packets: TCP/IP packet (Transmission Control Protocol/Internet Protocol), UDP/IP packet (User Datagram Protocol).

7. A method as claimed in claim 1, wherein the method comprises allocating, at the gateway, a particular number of said second port numbers in advance to the terminal device, and in response to the arrival of said first message at the gateway, replacing the first port number in the first message with one of the second port numbers allocated in advance to the terminal device.

8. A method as claimed in claim 7, wherein the particular number of second port numbers are allocated to said terminal device when the terminal device registers in the short-range communication network.

9. A method as claimed in claim 1, wherein the second port number is allocated to the terminal device in response to the arrival of the first message at the gateway, the first port number being replaced with the second port number in said first message.

10. A method as claimed in claim 1, wherein the gateway keeps a record of free port numbers and checks, in response to the arrival of the first message at the gateway, if the first port number in the first message is free.

11. A method as claimed in claim 10, wherein the gateway keeps a

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record of when each port number was last used as the second port number and concludes that said first port number is free if it has not been used as the second port number during a given period of time in other messages than those originating from said particular terminal device.

5           12. A method as claimed in claim 11, wherein if the gateway concludes that said first port number is free, it allocates a second port number to the terminal device and replaces said first port number in the first message with said second port number, the second port number being the same as said first port number.

10           13. A method as claimed in claim 10, wherein in a situation when the first port number in the first message is not free, the gateway allocates a second port number that is free to the terminal device, and replaces the first port number in the first message with said allocated second port number, the second port number being different from the first port number.

15           14. A method as claimed in claim 10, wherein in a situation when the first port number in the first message is not free, and the gateway has no free second port number, the gateway allocates as the second port number to the terminal device such a port number that has been unused for longest.

20           15. A method as claimed in claim 1, wherein the gateway takes care that the messages arriving from different terminal devices in the short-range communication network do not have the same source port number when they leave the gateway to the outside of the short-range communication network.

25           16. A method as claimed in claim 1, wherein the short-range communication network and the nearest network external to the short-range communication network operate in the same frequency range.

30           17. A method as claimed in claim 16, wherein the short-range communication network is a Bluetooth network and said nearest external network is a WLAN network (Wireless Local Area Network) and that the gateway comprises a WLAN network card for communicating information with a WLAN access point, the WLAN access point comprising an access point to the Internet.

          18. A method as claimed in claim 17, wherein the gateway communicates with the WLAN access point with a directional antenna to reduce interference between the Bluetooth network and the WLAN network.

35           19. A method as claimed in claim 17, wherein the gateway comprises a Bluetooth transceiver with antennas and a WLAN transceiver with

antennas, the antenna of the WLAN transceiver being a directional antenna, in which method the antenna of the WLAN transceiver is directed away from the antenna of the Bluetooth transceiver at the gateway and towards the WLAN access point to reduce interference between the WLAN transceiver and the

5 Bluetooth transceiver.

20. A method as claimed in claim 19, wherein the antenna of the Bluetooth transceiver at the gateway and the antenna of the WLAN transceiver are placed at a distance from one another to reduce interference.

21. A method as claimed in claim 19, wherein the gateway comprises more than one Bluetooth transceivers with antennas, the antennas of the Bluetooth transceivers being directional antennas that are directed in a different direction than the antenna of the WLAN transceiver.

22. A method as claimed in claim 17, wherein the WLAN network card acts as equal to the other network cards of the WLAN network.

23. A method as claimed in claim 17, wherein the WLAN network card acts as a slave to the network card of the WLAN access point that acts as a master.

24. A method as claimed in claim 1, wherein when the terminal device registers in the wireless short-range radio-frequency communication network, the terminal device assigns a unique Bluetooth identifier to the gateway and receives a virtual IP address from the gateway for use inside the short-range communication network.

25. A method of transmitting a message from an element external to a wireless short-range radio-frequency communication network via a gateway to a terminal device of the short-range communication network, the method comprising

selecting a first port number for the terminal device;

generating a correlation between a network address of the terminal device, said first port number and a particular second port number, the network address of the terminal device being a network address that is used inside the short-range communication network, and said second port number being intended to identify a right application in the terminal device, and storing said correlation in advance in a memory available to the gateway;

receiving a message at the gateway from the element external to the short-range communication network, the message comprising the network address of the gateway as a receiver's address and said first port number as a

destination port number;

replacing the network address of the gateway in the message with the network address of the terminal device and said first port number with the second port number, on the basis of said correlation;

- 5 transmitting the message from the gateway to the terminal device of the short-range communication network via a short-range radio link the message having the network address of the terminal device as a receiver's address and said second port number as a destination port number.

- 10 26. A method as claimed in claim 25, wherein the method comprises directing the message received at the terminal device to the right application based on the second port number.

27. A method as claimed in claim 25, wherein the storing is performed at least partly manually.

- 15 28. A method as claimed in claim 25, wherein the method comprises also storing a unique identifier of the terminal device in advance in the memory available to the gateway and receiving an inquiry at the gateway from outside said wireless short-range radio-frequency communication network, the inquiry inquiring, based on said unique identifier, about the first port number assigned to the terminal device.

- 20 29. A method as claimed in claim 28, wherein the method comprises transmitting said first port number in response to said inquiry to the outside of said wireless short-range radio-frequency communication network.

- 25 30. A method as claimed in claim 25, wherein in the method, the terminal device of the wireless short-range radio-frequency communication network is controlled with said message from outside the wireless short-range radio-frequency communication network.

31. A method as claimed in claim 28, wherein the wireless short-range radio-frequency communication network is a Bluetooth network and said unique identifier is a unique Bluetooth identifier.

- 30 32. A gateway for transmitting a message from a wireless radio-frequency short-range communication network via the gateway to a network external to the short-range communication network, the gateway comprising:

- 35 a short-range transceiver for receiving a first message at the gateway via a short-range radio link from a terminal device of the short-range communication network, the first message being addressed to an element external to the short-range communication network, and the first message

comprising the network address of said terminal device as a transmitter's address and the first port number as a source port number, the network address of the terminal device being a network address used inside the short-range communication network, wherein the gateway further comprises:

5       a processing element (CPU) for allocating a second port number to the terminal device;

          a processing element (CPU) for replacing the network address of said terminal device in the first message with the network address of the gateway and for replacing the first port number in the first message with the  
10       second port number;

          a processing element (CPU) for generating a correlation between the network address of the terminal device, the first port number and the second port number and storing it in a memory available to the gateway for identification of the terminal device;

15       a transceiver for transmitting the first message from the gateway to the element external to the short-range communication network, the first message having the network address of the gateway as a transmitter's address and said second port number as a source port number.

33. A gateway as claimed in claim 32, wherein said processing  
20       element is one of the following: a microprocessor, a micro controller or a digital signal processor.

34. A gateway for transmitting a message from an element external to a wireless short-range radio-frequency communication network via the gateway to a terminal device of the short-range communication network,  
25       wherein the gateway comprises:

          a processing element (CPU) for selecting a first port number for the terminal device;

          a processing element (CPU) for generating a correlation between a network address of the terminal device, said first number and a particular second port number and storing it in advance in a memory available to the gateway, the network address of the terminal device being a network address that is used inside the short-range communication network, and the second port number being intended for identifying a right application in the terminal device;

30       a transceiver for receiving a message at the gateway from the element external to the short-range communication network, the message comprising the network address of the gateway as a receiver's address and the  
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first port number as a destination port number;

a processing element (CPU) for replacing the network address of the gateway in the message with the network address of the terminal device and for replacing said first port number in said message with the second port number, on the basis of said correlation;

- 5 a short-range radio-frequency transceiver for transmitting the message from the gateway to the terminal device of the short-range communication network via a short-range radio link, the message having the network address of the terminal device as a receiver's address and said second port number as a destination port number.

35. Software executable at a gateway for transmitting a message from a wireless radio-frequency short-range communication network via the gateway to a network external to the short-range communication network, the software comprising:

- 15 program code for causing the gateway to receive a first message at the gateway via a short-range radio link from a terminal device of the short-range communication network, the first message being addressed to an element external to the short-range communication network and the first message comprising a network address of said terminal device as a transmitter's address and a first port number as a source port number, the network address of the terminal device being a network address used inside the short-range communication network, wherein the software comprises:

program code for allocating a second port number to the terminal device;

- 25 program code for replacing the network address of said terminal device in the first message with the network address of the gateway and for replacing the first port number in the first message with the second port number;

- 30 program code for generating a correlation between the network address of the terminal device, the first port number and the second port number and storing it in a memory available to the gateway for identifying the terminal device;

- 35 program code for causing the terminal device to transmit the message from the gateway to the element external to the short-range communication network, the first message having the network address of the gateway as a transmitter's address and said second port number as a source port number.

36. Software executable at a gateway for transmitting a message from an element external to a wireless short-range radio-frequency communication network via the gateway to a terminal device of the short-range communication network, wherein the software comprises:

5       program code for selecting a first port number for the terminal device;

          program code for generating a correlation between the network address of the terminal device, said first port number and a particular second port number and for storing it in advance in a memory available to the gateway, the network address of the terminal device being a network address used  
10       inside the short-range communication network, and said second port number being intended to identify the right application in the terminal device;

          program code for causing the gateway to receive a message at the gateway from the element external to the short-range communication network,  
15       the message comprising the network address of the gateway as a receiver's address and said first port number as a destination port number;

          program code for replacing the network address of the gateway in said message with the network address of the terminal device and for replacing said first port number in said message with the second port number, on the  
20       basis of said correlation;

          program code for causing the gateway to transmit the message from the gateway to the terminal device in the short-range communication network via a short-range radio link the message having the network address of the terminal device as a receiver's address and said second port number as  
25       a destination port number.